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Trawling: Seafloors Turning into Deserts by Destructive Method

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Abstract

Commercial fisheries all across the world use a technique called bottom trawling, in which a big, heavy net is dragged down the ocean floor and is used to catch anything that gets in its way. Previous studies have connected trawling to serious environmental effects, including the killing of shallow seabeds and the harvest of numerous non-target species, known as "bycatch." This strategy is now being found to have long-term, far-reaching effects in the deeper ocean and beyond, according to a new study published in Proceedings of the National Academy of Sciences.

Keywords: Fisheries; Bottom trawling; Bycatch; Seabeds; Environmental effects

Introduction

Trawling has been practised since the 1300s, and after commercial fishing was industrialised in the late 1800s, it spread too many coastal regions around the world. Cod, rockfish, as well as different kinds of squid and shrimp, are among the commercially valuable species that live close to the ocean floor that are targeted by bottom trawling [1]. The equipment used varies depending on the fishing operation, but nets as large as a city block can scoop thousands of fish and other marine creatures in a single drag.

Of all commercial fishing methods, bottom trawling has one of the highest rates of bycatch. The method is responsible for 82 percent of the bycatch that is thrown away in the North Pacific, or 18% of the region's annual ground fish catches. The proportion of bycatch in a net's total catch can occasionally reach 90%.

Studies have revealed that bottom trawling is extremely detrimental to the seabed in addition to directly killing countless fish and other marine animals. It shifts sediment, destroying the habitat of organisms that live on the ground, and it makes the water more opaque and unsuitable for many species while also releasing toxins and carbon that had been contained beneath the bottom [2]. Bottom trawling outfits are looking for new fishing grounds in ever-deeper ocean regions all over the world as populations of numerous fish species decline owing to excessive commercial fishing activity. Nevertheless, this new study suggests that trawling is also having an impact on deeper ocean bottoms since the nets devastate delicate seafloor ecosystems at a rate comparable to desertification.

The researchers, who are affiliated with a number of institutions in Italy and Spain, claim that the cumulative effects of trawling on the sediment structure, the biodiversity of benthic organisms, and the most fundamental of all food sources in these deep-sea sedimentary ecosystems are comparable to the catastrophic effects of man-accelerated soil erosion on land and the general environmental degradation of abandoned agricultural fields exposed to high levels of human impact [3]. Therefore, it is believed that extensive and on-going bottom trawling will eventually turn significant areas of the deep continental slop into faunal deserts and severely damaged seascapes.

Benthic ecosystems-those at the ocean's bottom-in the deep sea may take longer to recover than settings close to the shore, and they may be affected in ways that go beyond the limits of their depths and the oceans themselves [4]. "Even though we only looked at one site at a particular time of the year, our findings show the dramatic impact of trawling below 500 metres (1,600 feet) depths: we have no idea when the area under study recovers because it has been trawled every weekday for about 30 years, twice a day."

The time needed for deep-sea benthic communities to recover after an eventual cessation of trawling activities could, however, be significantly longer (possibly years or decades) than the time needed for shallow benthic communities because deep-sea fauna have longer life spans than their shallower counterparts, according to a reliable hypothesis [5]. "Therefore, it is evident that the depth at which trawling is conducted is related to the major variation in the time of recovery from trawling impact."

Off the coast of Spain, the researchers examined sediment samples from trawled and un-trawled locations and discovered that bottom trawling significantly decreased the overall number of extremely small organisms residing in deep-sea sediments [6]. Nematodes, microscopic worms that make up the dominating group in these habitats and are crucial for ecological processes, were particularly damaged.

According to the authors, "previous research provided evidence for the first time ever that the loss of even a few species of nematodes in deep-sea sedimentary habitats may result in a "collapse" of deep sea functions," and they discovered about "20 species in trawled bottoms and about 34 species in undisturbed sediments." Overall, the scientists discovered that sediment from chronically trawled areas contained 80% fewer meiofauna, or tiny benthic organisms, and 50% less biodiversity than sediment from un-trawled areas [7]. Trawling was also shown to be associated with a 52 percent decrease in organic matter and a 37 percent decrease in the intake of organic carbon.

The carbon cycle, which involves the exchange of carbon between the land, sea, and air, includes deep-sea meiofauna as an essential component. Bottom trawling is so common along the world's coasts, according to the researchers, that it may have a significant impact on how carbon is cycled [8]. The authors state that deep-sea trawling "is currently practised along large sectors of the oceans and appears to

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have severe consequences on deep-sea sediment dynamics at a global scale."

Due to the fact that many creatures eventually rely on meiofauna for energy and nutrients, these effects may be seen further up the marine food chains. Furthermore, some meiofauna are the larvae of larger species, or macrofaunal species [9]. Trawling may cause damage to deep-sea beds, which could result in the destruction of many species' nidal habitats as well as the depletion of a vital food source.

Trawling not only completely eliminates meiofauna but also disturbs the layer of carbon-rich material that serves as their main source of energy [10]. As a result, this material hangs suspended in the water, where it either takes a very long time to re-descend or is carried by ocean currents to even deeper regions of the ocean, far from the life that depends on it.

Conclusion

In our work, we hypothesised that sediments re-suspended at 500-meter depths may go to the deepest portion of the canyon, where settlements at 2,000-meter (6,500-foot) depth are located. Many countries have put limitations on bottom trawling. For instance, the United States outlawed bottom trawling off most of its Pacific coast in 2006, and Palau has outlawed it both domestically and internationally, making it illegal for any Palauan to engage in it. In two of the most affected locations, the mid-Atlantic Ridge and the South Pacific, a few multilateral fisheries commissioners have also put limitations on bottom trawling. But during UN deliberations, Iceland and other antagonistic nations rejected Palau's attempt to outlaw unrestricted bottom trawling globally.

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Conflict of Interest

None

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